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REMARKS

In the Office Action, the Examiner noted that claims 1-31 are pending in the application, and that claims 1-23 and 30 are rejected. Claims 24-29 and 31 have been allowed. By this response, claims 1, 9, 10, 12, 13, 21, 22, 28, and 29 are amended, and claims 2-8, 11, 14-20, 23-27 and 30-31 continue unamended.

In view of the above amendments and the following discussion, Applicants submit that none of the claims now pending in the application are indefinite under the provisions of 35 U.S.C. §112, anticipated under the provisions of 35 U.S.C. §102, or obvious under the provisions of 35 U.S.C. §103. Thus, Applicants believe that all of these claims are now in condition for allowance.

I. REJECTION OF CLAIMS 5, 6, 18, AND 30 UNDER 35 U.S.C. §112

The Examiner rejected claims 5, 6, 18 and 30 as being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicants regard as the invention. Specifically, the Examiner stated that the specification fails to disclose that the bases of the first and second transistors have base widths less than 4.0 microns or in a range of 0.6 to 0.8 microns.

The Applicants have amended the specification to include the above-mentioned features previously recited in the originally filed claims of the Applicants' invention. In particular, the Applicants have amended the specification on pages 15 and 16, paragraph 51, to include text describing that the base widths W_N and W_P are less than 4.0 microns, and in one embodiment, "the base widths W_N and W_P are both in a range of 0.6 to 0.8 microns." The claims are part of the specification and the above-mentioned features are now being recited in the detailed description. The Applicants submit that such additional disclosure to the specification does not add any new subject matter.

Thus, the Applicants submit that claims 5, 6, 18 and 30, as amended, fully satisfy the requirements of 35 U.S.C. §112 and are patentable thereunder. Therefore, the Applicants respectfully request that the rejection be withdrawn.

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II. REJECTION OF CLAIMS 9, 10, 12, AND 13 UNDER 35 U.S.C. §112

The Examiner rejected claims 9, 10, 12, and 13 as being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicants regard as the invention. Specifically, the Examiner stated that the claims are indefinite for failing to particularly point out and distinctly claim the subject matter, which the Applicants regard as the invention. The Applicants respectfully traverse the rejection.

The Applicants have amended claims 9, 10, 12, and 13 to provide proper antecedent basis for limitations thereof. In particular, the Applicants have amended claims 9 and 12 to recite "a source and drain of the MOSFET." Similarly, in claims 10 and 13, the Applicants have amended the claim to recite "a gate of the MOSFET." Thus, Applicants submit that claims 9, 10, 12, and 13, as amended, fully satisfy the requirements of 35 U.S.C. §112 and are patentable thereunder. Therefore, the Applicants respectfully request that the rejections be withdrawn.

III. REJECTION OF CLAIMS 1 AND 2 UNDER 35 U.S.C. §102

The Examiner rejected claims 1 and 2 as being anticipated by Russ (United States patent publication 2002/0041007). The rejection is respectfully traversed.

Claim 1 recites:

"An electrostatic discharge (ESD) protection circuit in a semiconductor integrated circuit having protected circuitry, the ESD protection circuit comprising:

a silicon controlled rectifier (SCR) having an anode coupled to the protected circuitry and a cathode coupled to ground, said cathode having at least one first high-doped region;

at least one trigger-tap, disposed proximate to the at least one high-doped region; and

an external on-chip triggering device coupled to the trigger-tap and the protected circuitry." (emphasis added).

"Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim" (Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co., 730 F.2d 1452, 221 U.S.P.Q. 481, 485 (Fed. Cir. 1984) (citing Connell v. Sears, Roebuck & Co., 722 F.2d 1542, 220

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U.S.P.Q. 193 (Fed. Cir. 1983)) (emphasis added). The Russ reference fails to disclose each and every element of the claimed invention, as arranged in the claim.

In particular, Russ discloses an electrostatic discharge (ESD) protection circuit including a silicon control rectifier (SCR) having a plurality of SCR fingers. The SCR protection circuit is connected from a pad to ground where the pad is also connected to the protected circuitry of an IC. A single triggering device is either connected to a first trigger gate or a second trigger gate. A single triggering device may be used to proficiently and reliably trigger all of the SCR fingers in the ESD protection device (see Russ, Abstract, Column 1, ¶¶5, and Column 3, ¶¶28). Accordingly, the triggering device is not disclosed.

Nowhere is there any teaching, or even suggestion, of "an external on-chip triggering device coupled to the trigger-tap of the protected circuitry." Specifically, referring to the schematic diagram A of FIG. 2A along with FIG. 4 of the Applicants' invention, the NMOS transistor 206 is an on-chip transistor external to the SCR 202 (see specification, page 20). By contrast, the Russ reference merely discloses that a trigger gate, such as trigger gate G1 205 or trigger gate G2 207 is coupled to a trigger tap. However, nowhere in the Russ reference is there any teaching that the trigger device itself is external to the SCR. Therefore, the Russ reference fails to teach each and every element of the claimed invention, as arranged in the claim.

As such, the Applicants submit that independent claim 1 is not anticipated and fully satisfies the requirements of 35 U.S.C. §102 and is patentable thereunder. Furthermore, claim 2 depends from independent claim 1 and recites additional features thereof. As such, and for at least the same reasons as discussed above, the Applicants submit that this dependent claim is also not anticipated and fully satisfies the requirements of 35 U.S.C. §102 and is patentable thereunder. Therefore, the Applicants respectfully request that the rejections be withdrawn.

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IV. REJECTION OF CLAIMS UNDER 35 U.S.C. §103

(a) Claims 3, 5-7, 15, 16, 18, and 19

The Examiner rejected claims 3, 5-7, 15, 16, 18, and 19 as being unpatentable over Russ (United States patent publication 2002/0041007. The rejection is respectfully traversed.

Claims 3 and 5-7 depend from independent claim 1 and recite additional features thereof. For example, claim 3, when combined with independent claim 1, recites:

"An electrostatic discharge (ESD) protection circuit in a semiconductor integrated circuit having protected circuitry, the ESD protection circuit comprising:

a silicon controlled rectifier (SCR) having an anode coupled to the protected circuitry and a cathode coupled to ground, said cathode having at least one first high-doped region;

at least one trigger-tap, disposed proximate to the at least one high-doped region;

an external on-chip triggering device coupled to the trigger-tap and the protected circuitry; and

wherein the SCR comprises a first bipolar transistor T1 and a second bipolar transistor T2; said first bipolar transistor having the at least one first high doped region serving as an emitter and forming the cathode, a first low doped region coextensively forming a base of the first bipolar transistor T1 and a collector of the second bipolar transistor T2, a second low doped region coextensively forming a base of the second bipolar transistor T2 and a collector of the first bipolar transistor T1, and a second high doped region serving as an emitter of the second bipolar transistor T2 and forming the anode." (emphasis added).

The test under 35 U.S.C. §103 is not whether an improvement or a use set forth in a patent would have been obvious or non-obvious; rather the test is whether the claimed invention, considered as a whole, would have been obvious. Jones v. Hardy, 110 U.S.P.Q. 1021, 1024 (Fed. Cir. 1984) (emphasis added). Thus, it is impermissible to focus either on the "gist" or "core" of the invention, Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc., 230 U.S.P.Q. 416, 420 (Fed. Cir. 1986) (emphasis added). Moreover, the invention as a whole is not restricted to the specific subject matter claimed, but also embraces its properties and the problem it solves. In re Wright, 6 U.S.P.Q. 2d 1959, 1961 (Fed. Cir. 1988) (emphasis added).

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As discussed above, the Russ reference fails to teach or suggest an external on-chip triggering device coupled to the trigger-tap and the protected circuitry. Rather, the Russ reference merely discloses that a trigger device is coupled to a trigger gate of the SCR device. That is, Russ merely discloses that a single triggering device is either connected to a first trigger gate or a second trigger gate, such as the base of the NMN transistor or the PNP transistor (see Russ, column 3, ¶¶28, and column 4, ¶¶36, and FIG. 1). Nowhere is there any teaching or suggestion of the triggering device being an external on-chip triggering device. Therefore, the Russ reference fails to teach the Applicants' invention as a whole. As such, the Applicants submit that claim 3 is not obvious and fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder. Furthermore claims 5-7, when combined with independent claim 1, recite additional features thereof. As such and at least for the same reasons as discussed above, the Applicants submit that claims 5-7 are not obvious and fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

Likewise, independent claim 15 recites similar features as recited in claim 3, when combined with independent claim 1. As such and at least for the same reasons as discussed above, the Applicants submit that independent claim 15 is not obvious and fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder. Furthermore, claims 16, 18 and 19 depend from independent claim 15 and recite additional features thereof. As such, the Applicants submit that these dependent claims are also not obvious and fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder. Therefore, the Applicants respectfully request that the rejection be withdrawn.

(b) Claims 4, 8-14, 17, and 20-23

The Examiner has rejected claims 4, 8-14, 17, and 20-23 as being obvious under 35 U.S.C. §103 over Russ in view of Polgreen et al. (U.S. Patent 5,464,189, issued November 7, 1995, hereinafter "Polgreen"). The Applicants respectfully traverse the rejection.

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The combination of Russ in view of Polgreen fails to teach the Applicants' invention as a whole. In particular, claim 4, when combined with independent claim 1, recites:

"An electrostatic discharge (ESD) protection circuit in a semiconductor integrated circuit having protected circuitry, the ESD protection circuit comprising:

a silicon controlled rectifier (SCR) having an anode coupled to the protected circuitry and a cathode coupled to ground, said cathode having at least one first high-doped region;

at least one trigger-tap, disposed proximate to the at least one high-doped region;

an external on-chip triggering device coupled to the trigger-tap and the protected circuitry; and

wherein a surface area between the respective first and second high-doped regions of the first and second bipolar transistors are blocked from shallow trench isolation. (emphasis added).

As discussed above, the Russ reference merely discloses that a trigger gate is coupled to an interspersed high doped first region. Nowhere in the Russ reference is there any teaching of an external on-chip triggering device.

Furthermore, the Polgreen reference fails to bridge the substantial gap as between the Russ reference and the Applicants' invention. In particular, the Polgreen reference discloses that the triggering device is integrated with the SCR. As shown in FIG. 4, the n₃+ region is formed over the junction between the n₁ well and p well. That is, the PNP transistor has an emitter formed by the p₁+ region and its base formed by the n₁ region plus the n₃+ region. Furthermore, the n₃+ region forms a drain of the MOS triggering device. As such, the triggering device is integrated with the SCR device, which teaches away from the Applicants' invention. That is, the Polgreen reference discloses an integrated trigger device, as opposed to an external trigger device.

Even if the references could somehow be operably combined, the combination would merely disclose an ESD protection circuit including an SCR having a plurality of SCR fingers where a trigger device is integrated into each of the SCR fingers. This is completely different from the Applicants' invention that recites the feature of "an external on-chip triggering device coupled to the trigger tap and the protected circuitry."

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Therefore, the combination of Russ and Polgreen fails to teach the Applicants' invention as a whole.

As such, the Applicants submit that claims 4 and 8-14 are not obvious and fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

Furthermore, claims 17 and 20-23 depend from independent claim 15 and recite similar features thereof. As such, and at least for the same reasons as discussed above, the Applicants submit that these dependent claims are also not obvious and fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder. Therefore, the Applicants respectfully request that the rejection be withdrawn.

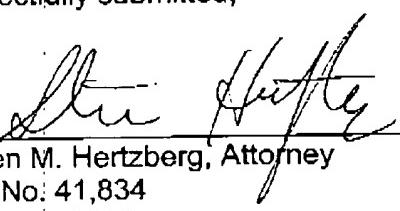
CONCLUSION

Thus, Applicants submit that none of the claims presently in the application are indefinite under the provisions of 35 U.S.C. §112, or obvious under the provisions of 35 U.S.C. §103. Consequently, Applicants believe that all these claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

If, however, the Examiner believes that there are any unresolved issues requiring adverse final action in any of the claims now pending in the application, it is requested that the Examiner telephone Mr. Steven Hertzberg, at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

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